

### **REMARKS**

Based on the above amendment and the following remarks, applicants respectfully submit that all the pending claims are in condition for allowance.

#### **Status of the Claims**

Claims 1-35 remain pending. Claims 1-2, 21-22, 30-32 and 34 have been amended.

#### **Objections to the Claims**

The examiner objected to claims 2 and 31 for various informalities. Applicants have amended the claims to correct these informalities.

#### **Rejections under 35 USC § 101**

Claims 1-35 stand rejected under 35 USC § 101 as being directed to non-statutory subject matter. Insofar as this rejection applies to the claims as amended, applicants respectfully traverse. Amended independent claim 1 recites “training a set of individual neural networks to produce one or more output values in response to a plurality of input values from a logging tool”. Unamended independent claim 18 recites “training ... in response to a plurality of inputs of actual values of geophysical parameters measured in the well”. Amended independent claim 32 recites “receiving log data from a pulsed neutron logging tool”. Amended independent claim 34 recites “training ... in response to pulsed neutron well log input data”.

Thus, each of the independent claims requires input values or data that represents measurements of a physical object or activity. Accordingly, these claims fall within a “safe harbor” as described in the MPEP on p. 2100-16 of the MPEP 8<sup>th</sup> edition rev. 3 (in § 2106 IV.B.2.(b) i): Safe Harbors, Subheading “Manipulation of Data Representing Physical Objects or Activities (Pre-Computer Process Activity)”). The MPEP states “Another statutory process is one that requires the measurements of physical objects or activities to be transformed outside of the computer into computer data,” with cites to various cases including *In re Taner*, 681 F.2d 787,

790, 214 USPQ 678, 681 (CCPA 1982). The claims in Taner recite processing of seismic data, and they were found by the court to be statutory for just this reason. Thus the independent claims and their respective dependent claims constitute patentable subject matter. For at least this reason applicants request that this rejection be withdrawn.

### **Rejections under 35 USC § 102**

Claims 1-6, 10, 12-13, 15-17, and 32-33 stand rejected under 35 USC § 102(b) as being anticipated by Z.H. Zhou et al., "Genetic Algorithm based Selective Neural Network Ensemble", Proc. 17<sup>th</sup> Internat'l Joint Conf. on AI, Seattle, WA, 2001, v.2, pp.797-802 ("Zhou"). Applicants respectfully traverse. "To anticipate a claim, the reference must teach every element of the claim." (MPEP 2131.)

Independent claims 1 and 32 each recite in part "a multi-objective fitness function". An example of a multi-objective fitness function is described in the present application at ¶36 *et seq.* The examiner cites Zhou's Abstract as teaching this limitation. However, Zhou does not teach any such fitness function there or elsewhere. To the contrary, Zhou teaches a single objective fitness function based on an estimated generalization error. *Zhou* p800, equation (26) and the paragraph thereafter. For at least this reason, independent claims 1 and 32, along with their dependent claims 2-6, 10, 12-13, 15-17, and 33, are allowable over the cited art.

### **Rejections under 35 USC § 103**

Claims 11, 14, and 34-35 stand rejected under 35 USC § 103(a) as being unpatentable over Zhou, and further in view of P.M. Granitto et al., "Modeling of Sonic Logs in Oil Wells with Neural Networks Ensembles", Argentine Symp. On AI (ASAI'01), 2001, <http://citeseer.ist.psu.edu/granitto01modeling.html> ("Granitto"). Claims 18-31 stand rejected under 35 USC § 103(a) as being unpatentable over Zhou, and further in view of U.S. Patent 5,862,513 ("Mezzatesta"). Applicants respectfully traverse each of these rejections. A prima

facie case of obviousness requires, among other things, that “the prior art reference (or references when combined) must teach or suggest all the claim limitations.” (MPEP 2142.)

#### Claims 11, 14, and 34-35

Claims 11 and 14 depend from independent claim 1 and hence incorporate the “multi-objective fitness function” limitation. As previously explained, Zhou teaches a single objective fitness function. Granitto similarly teaches a single objective fitness function, i.e., “the generalization error ... of the aggregate predictor”. (Granitto § 3, Step 2.) Because the cited art fails to teach or suggest the quoted limitation, dependent claims 11 and 14 are allowable over the cited art.

Independent claim 34 also recites “a multi-objective fitness function”, a claim limitation which is not taught by Zhou or Granitto. For at least this reason, independent claim 34 and its dependent claim 35 are allowable over the cited art.

#### Claims 18-31

Independent claim 18 recites in part “a neural network ensemble selected by: ... using a genetic algorithm having a multi-objective fitness function”. Zhou fails to teach or suggest such a limitation for the reasons given previously. Mezzatesta is silent with regard to neural network ensembles, and hence it is unsurprising that no suggestion of a suitable multi-objective fitness function can be found there. For at least this reason, independent claim 18 and its dependent claims are allowable over the cited art.

#### Conclusion

In the course of the foregoing discussions, applicant may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood

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that there may be other distinctions between the claims and the prior art which have yet to be raised, but which may be raised in the future.

The examiner is encouraged to contact the undersigned if a telephonic discussion would aid the examination process. If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769/1391-49300/HDJK.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Daniel J. Krueger', is written over the typed name and address.

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